

ABSTRACT OF THE DISCLOSURE

5 A system and methods for generating a variable rate filtered output using
synchronous filters having the same filter sampling time, that avoids complexities of
asynchronous filters. A system employs multiple filters that are staggered in time and
set so that the output of one of the multiple filters is available whenever a secondary
process requires state information. In another embodiment, the synchronous filters
are programmable so as to change the filter sampling time. This configuration is
possible when it is known that the prescribed time interval of the secondary process is
longer than the filter sampling time and the prescribed time interval is an integer
multiple of the filter sampling time. By using programmable filters, the number of
filters required to accommodate a certain prescribed time interval can be minimized.
Whether a system employs multiple non-programmable filters staggered in time or
programmable filters, the invention achieves producing a variable rate filtered output
while using synchronous filters. Thus, computationally intensive and complicated
variable rate filters can be avoided while minimizing processor requirements. In
another aspect of the invention, the inventive method of generating a variable rate
filtered output is employed in a lithography system to control the movements of
various components therein. In one embodiment, the filtered outputs are used to
estimate the relative positions of the reticle and the wafer. With the variable rate
feature, the lithography system can dynamically accommodate for the noise arising
from component movements and other sources in the wafer exposure process.